



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/091,502	03/07/2002	Yong Che	220305US0	8897
22850	7590	03/24/2004		
OBLON, SPIVAK, MCCLELLAND, MAIER & NEUSTADT, P.C. 1940 DUKE STREET ALEXANDRIA, VA 22314			EXAMINER ALEJANDRO, RAYMOND	
			ART UNIT 1745	PAPER NUMBER

DATE MAILED: 03/24/2004

Please find below and/or attached an Office communication concerning this application or proceeding.



UNITED STATES PATENT AND TRADEMARK OFFICE

h
COMMISSIONER FOR PATENTS
UNITED STATES PATENT AND TRADEMARK OFFICE
P.O. Box 1450
ALEXANDRIA, VA 22313-1450
www.uspto.gov

MAILED

MAR 24 2004

GROUP 1700

**BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES**

Paper No. 20040317

Application Number: 10/091,502
Filing Date: March 07, 2002
Appellant(s): CHE ET AL.

Oblon, Spivak, McClelland, Maier & Neustadt, P.C.
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 03/05/2004.

Art Unit: 1745

(1) *Real Party in Interest*

A statement identifying the real party in interest is contained in the brief.

(2) *Related Appeals and Interferences*

A statement identifying the related appeals and interferences which will directly affect or be directly affected by or have a bearing on the decision in the pending appeal is contained in the brief.

(3) *Status of Claims*

The statement of the status of the claims contained in the brief is correct.

(4) *Status of Amendments After Final*

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) *Summary of Invention*

The summary of invention contained in the brief is correct.

(6) *Issues*

The appellant's statement of the issues in the brief is correct.

(7) *Grouping of Claims*

Appellant's brief includes a statement that the claims do stand or fall together and provides reasons as set forth in 37 CFR 1.192(c)(7) and (c)(8). (Refer to VI. Issues and VII. Grouping of the Claims)

(8) *Claims Appealed*

The copy of the appealed claims contained in the Appendix to the brief is correct.

Art Unit: 1745

(9) Prior Art of Record

6399251	Honbo et al	06-2002
6558846	Tsushima et al	05-2003
6294292	Tsushima et al	09-2001
JP 2000-090972	Kuruma et al	03-2000

(10) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

This rejection is set forth in prior Office Actions.

Claim Rejections – 35 USC 103

1. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.
2. Claims 1-2, 5-8, 11-12 and 15-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over the Japanese publication JP 2000-090972 in view of Honbo et al 6399251.

The instant application is directed to a secondary power source wherein the disclosed inventive concept comprises the specific negative electrode density. Other limitations include the specific carbon material and its characteristics; the binder; the specific surface area; and the solvent and lithium salt.

With respect to claims 1 and 11:

The JP'972 publication discloses a secondary power source having a positive electrode including the activated carbon, a negative electrode including a carbon material for storing and releasing lithium ion (*that is, capable of doping and undoping lithium ions*), and the organic

Art Unit: 1745

electrolyte containing the lithium salt (ABSTRACT). It is disclosed that the secondary power source is a lithium rechargeable battery (SECTION 0005).

It is disclosed that the weight ratio of the carbon material and binder is from 70:30 - 96:4 (SECTION 0031). Thus, the negative electrode contains from 4-30 weight % of a binder.

Example 1 shows a negative electrode comprising a weight ratio of 9:1 of carbon material to binder (SECTION 0035). Thus, the negative electrode contains 10 weight % of the binder. Thus, the negative electrode is made of carbon material and this specific amount of binder.

It is also disclosed that amount of conducting material in the positive electrode ranges from 0.1-20 % (SECTION 0023); and the binder content in the positive electrode also ranges from 1-20 % (SECTION 0024). Thus, the positive electrode is made of activated carbon material and these specific amount of binder and conducting agent.

With respect to claims 2, 12:

It is disclosed that the carbon material has a lattice spacing of [002] of 0.335-0.410 nm according to X-ray diffraction (SECTION 0025).

With respect to claims 5 and 15:

It is disclosed that the weight ratio of the carbon material and binder is from 70:30 - 96:4 (SECTION 0031). Thus, the negative electrode contains from 4-30 weight % of a binder.

Example 1 shows a negative electrode comprising a weight ratio of 9:1 of carbon material to binder (SECTION 0035). Thus, the negative electrode contains 10 weight % of the binder.

With respect to claims 6 and 16:

It is disclosed the use polyvinylidene fluoride as a binder (SECTION 0027).

With respect to claim 7:

Art Unit: 1745

It is disclosed that the activated carbon contained in the positive electrode has a specific surface area of 800-3000 m²/g.

With respect to claim 8:

It is disclosed that the solvent of the organic electrolyte contains propylene carbonate (ABSTRACT); ethylene carbonate, butylene carbonate, dimethyl carbonate, ethyl methyl carbonate, diethyl carbonate, sulfolane, dimethoxyethane (SECTION 0010). The lithium salt maybe LiPF₆, LiBF₄, LiClO₄, LiN(SO₂CF₃)₂, CF₃SO₃Li, LiC(SO₂CF₃)₃, LiAsF₆ and LiSbF₆ (SECTION 0032).

The JP'972 publication discloses a secondary power source according to the foregoing. However, the JP'972 publication does not expressly disclose the specific negative electrode density.

Honbo et al disclose a lithium secondary battery wherein the negative electrode active material is characterized in containing carbon, and its negative electrode density is in the range larger than 0.95 g/cm³, and smaller than 1.5 g/cm³ (COL 3, lines 57-61).

In view of these disclosures, it would have been obvious to one skilled in the art at the time the invention was made to make the negative electrode of the JP'972 publication by having the specific negative electrode density of Honbo et al as Honbo et al teach that if the negative electrode density is smaller than 0.95 g/cm³, vacancies in the negative electrode are numerous and the specific surface area as the electrode is large. Accordingly, a large amount of positive electrode material is precipitated on the surface and inside of the negative electrode. The precipitated positive electrode material decreases the capacity of the negative electrode significantly, and makes the cycle life short. If the negative electrode density is larger than 1.5

Art Unit: 1745

g/cm³, the vacancy in the negative electrode is too small to make the electrolyte penetrate into the inside of the electrode. Therefore, the capacity of the negative electrode is decreased significantly, and the objective lithium secondary battery for mounting on power sources can not be obtained. Hence, those of ordinary skill in the art would obviously envision that the claimed negative electrode density is within the disclosed range, and therefore, an electrode having the claimed negative electrode density would exhibit the same desirable characteristics.

3. Claims 3-4, 9-10 and 13-14 rejected under 35 U.S.C. 103(a) as being unpatentable over the Japanese publication JP 2000-090972 in view of Honbo et al 6399251 as applied to claims 1 and 11 above, and further in view of Nishimura et al 6103373.

The JP'972 publication and Honbo et al are applied, argued and incorporated herein for the reasons above.

As to claims 3-4 and 13-14:

Additionally, the JP'972 publication does disclose that a vapor-growth carbon fiber maybe used as the carbon material (SECTION 0005). It is disclosed that the graphite system carbon material has a desirable lattice spacing of [002] of 0.335-0.338 nm (SECTION 0025).

EXAMPLE 6 shows a negative electrode wherein the graphite system has a lattice spacing of [002] of 0.337 nm (EXAMPLE 6).

As for claims 9 and 10:

The JP'972 publication discloses that the weight ratio of the carbon material and binder is from 70:30 - 96:4 (SECTION 0031). Thus, the negative electrode contains from 4-30 weight % of a binder. Example 1 shows a negative electrode comprising a weight ratio of 9:1 of carbon

Art Unit: 1745

material to binder (SECTION 0035). Thus, the negative electrode contains 10 weight % of the *binder*. It is disclosed the use polyvinylidene fluoride as a binder (SECTION 0027).

However, the foregoing prior art does not expressly disclose the specific amount of carbon fibers in the negative electrode as recited in claims 3 and 13; the specific lattice distance as recited in claims 4 and 14 (which depends from claims 3 and 13) and specific binder amount and material as recited in claims 9-10 (which depends from claim 3).

With respect to claims 3-4 and 13-14:

Nishimura et al disclose carbon fiber materials used as an electrode material for making electrodes in secondary batteries (ABSTRACT) wherein the electrode material is suitable for making negative electrodes (COL 5, lines 56-59). It is further disclosed that the amount of fiber material, comprised mainly of VGCF (*vapor grown carbon fiber*) to be added is between 0.15-30 w/o weight percent (COL 10, lines 45-55); the mixing ratio of the agglomerate should be between 5-20 w/o of the total weight of the electrode mixture (COL 11, lines 55-60). It is further disclosed that the material has a plane spacing (d0002) of less than 0.34 nm (COL 10, line 65-COL 11, line 3).

With respect to claims 9-10:

Nishimura et al discloses in EMBODIMENTS 4-6 that the binder content is either 7 wt. % or 10 wt. % (COL 14, lines 11-14, lines 30-33 & lines 48-51). It is also disclosed that the binder is a fluororesin (COL 11, lines 25-27).

In view of the above, it would have been obvious to one skilled in the art at the time the invention was made to make the negative electrode of both the JP'972 publication and Honbo et al by containing the specific amount of carbon fibers in the negative electrode as Nishimura et al

Art Unit: 1745

disclose that when the amount of addition exceeds 30 weight %, the volume of the carbon fiber is too high and the amount of the electrode active ingredient is reduced, the effect becomes reversed and the charge storage capacity begins to drop. When the amount is less than 0.1 weight %, the effect of providing increased contact points to the particles is lessened so that the electrical resistance cannot be lowered, resulting in not producing improvement in the charge storage capacity. Hence, those of ordinary skill in the art would obviously envision that the claimed negative amount of carbon fibers in the negative electrode is within the disclosed range, and therefore, an electrode having the claimed amount of carbon fibers would exhibit the same desirable characteristics.

As to the specific lattice distance, it would have been obvious to one skilled in the art at the time the invention was made to make the carbon fibers of both the JP'972 publication and Honbo et al by having the specific lattice distance as Nishimura et al teach that a carbon fiber material having a plane spacing (d_{0002}) of less than 0.34 nm is preferred because it provides a graphite material with a layer structure to enable the lithium ions to be intercalated. Accordingly, since Nishimura et al teach preferred lattice distances lower than 0.34 nm to provide a graphite material enabling intercalation of lithium ions, Nishimura et al directly teaches the use of a lattice distance within the claimed range (*See MPEP 2144.05 Obviousness of Ranges*). Furthermore, Nishimura et al's teaching is consistent with the disclosure of the JP'972 publication wherein is stated that a lattice spacing of 0.335-.338 nm is desirable for reducing resistance.

As to the specific binder amount and material, it would have been obvious to one skilled in the art at the time the invention was made to make the negative electrode of both the JP'972

Art Unit: 1745

publication and Honbo et al by containing the specific binder amount as Nishimura et al teach that binders act as bonding agent for the negative material mixture. In that, since Nishimura et al teach examples using the specific binder amount, those of ordinary skill will recognize that by using the claimed binder amount in the electrode material, the binder itself will meet its intended functionality as a bonding agent. Thus, the prior art directly teaches the use of a binder within the claimed range (*See MPEP 2144.05 Obviousness of Ranges*). Furthermore, Nishimura et al's teaching is consistent with the disclosure of the JP'972 publication wherein is stated that the amount of binder in the negative electrode ranges from 4-30 weight %, and if more than 30 wt. % is used, the electrode capacity is reduced as well as if less than 4 wt. % is used, the binding characteristic weakens producing ablation between the negative electrode and the current collector. Regarding the binder material, it would be obvious to use the claimed binder material in the negative electrode of both the JP'972 publication and Honbo et al as Nishimura et al disclose that fluororesins serve as a bonding agent for negative electrode mixture; additionally, Nishimura et al's teaching is consistent with the disclosure of the JP'972 publication showing that a fluororesin such as polyvinylidene fluoride provides suitable binding properties to be employed in negative electrode.

Double Patenting

4. The text of those sections of Double Patenting not included in this action can be found in a prior Office action.

Art Unit: 1745

5. Claims 11-12 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1, 3, 7 and 15 of U.S. Patent No. 6294292 in view of Honbo et al 6399251.

The U.S. Patent No. 6294292 claims the following (claims 1, 3, 7 and 15):

1. A secondary power source, which comprises
a positive electrode containing activated carbon, 20
a negative electrode containing a carbon material capable
of doping and undoping lithium ions, and
an organic electrolyte containing a lithium salt, wherein
a ratio of the positive electrode capacity (C^+) to the 25
negative electrode capacity (C^-), i.e. C^+/C^- , is from 0.1
to 1.2,
the positive electrode has a thickness of from 100 to 200
 μm , and
the negative electrode has a thickness of from 10 to 50 30
 μm .
3. The secondary power source according to claim 1,
wherein the carbon material has a lattice spacing of [002]
face of from 0.335 to 0.410 nm. 40
7. The secondary power source according to claim 1,
wherein the activated carbon of the positive electrode has a
specific surface area of from 800 to 3,000 m^2/g .
- 30 15. A secondary power source, which comprises
a positive electrode containing activated carbon,
a negative electrode containing a carbon material capable
of doping and undoping lithium ions, and
35 an organic electrolyte containing a lithium salt, wherein
a ratio of the positive electrode capacity (C^+) to the
negative electrode capacity (C^-), i.e. C^+/C^- , is from 0.1
to 1.2, and
40 the positive electrode contains a lithium transition metal
oxide in an amount of from 0.1 to 20 wt %.

The US'292 patent claims a secondary power according to the above-mentioned aspects.

However, the US'292 patent does not expressly claim the specific negative electrode density.

Honbo et al disclose a lithium secondary battery wherein the negative electrode active material is characterized in containing carbon, and its negative electrode density is in the range larger than 0.95 g/cm^3 , and smaller than 1.5 g/cm^3 (COL 3, lines 57-61).

In view of these disclosures, it would have been obvious to one skilled in the art at the time the invention was made to make the negative electrode of the US'292 patent by having the specific negative electrode density of Honbo et al as Honbo et al teach that if the negative electrode density is smaller than 0.95 g/cm^3 , vacancies in the negative electrode are numerous and the specific surface area as the electrode is large. Accordingly, a large amount of positive electrode material is precipitated on the surface and inside of the negative electrode. The precipitated positive electrode material decreases the capacity of the negative electrode significantly, and makes the cycle life short. If the negative electrode density is larger than 1.5 g/cm^3 , the vacancy in the negative electrode is too small to make the electrolyte penetrate into the inside of the electrode. Therefore, the capacity of the negative electrode is decreased significantly, and the objective lithium secondary battery for mounting on power sources can not be obtained. Hence, those of ordinary skill in the art would obviously envision that the claimed negative electrode density is within the disclosed range, and therefore, an electrode having the claimed negative electrode density would exhibit the same desirable characteristics.

6. Claims 11-12 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1, 3, 5 and 7-8 of U.S. Patent No. 6558846 in view of Honbo et al 6399251.

The U.S. Patent No. 6558846 claims the following (claims 1, 3, 5 and 7-8):

Art Unit: 1745

1. A secondary power source, which comprises a positive ³⁰
 electrode comprising activated carbon and a lithium-
 containing transition metal oxide, a negative electrode com-
 prising a carbon material capable of doping and undoping
 lithium ions, and an organic electrolyte comprising a lithium
 salt, wherein the lithium-containing transition metal oxide is ³⁵
 an oxide of lithium and at least one element selected from
 the group consisting of Mn, Fe, Co, Ni, Zn, and W, and the
 lithium-containing transition metal oxide is present in the
 positive electrode in an amount of from 0.1 to 15 wt %.

3. The secondary power source according to claim 1,
 wherein the activated carbon of the positive electrode has a ⁴⁵
 specific surface area of from 800 to 3,000 m²/g.

5. The secondary power source according to claim 1,
 wherein the carbon material of the negative electrode has a
 5 spacing of [002] face of from 0.335 to 0.410 nm.

7. The secondary power source according to claim 1,
 10 wherein the organic electrolyte comprises at least one sol-
 vent selected from the group consisting of ethylene
 carbonate, propylene carbonate, butylene carbonate, dim-
 ethyl carbonate, ethylmethyl carbonate, diethyl carbonate,
 sulfolane and dimethoxyethane.

15 8. The secondary power source according to claim 1,
 wherein the lithium salt is at least one member selected from
 the group consisting of LiPF₆, LiBF₄, LiClO₄,
 LiN(SO₂CF₃)₂, CF₃SO₃Li, LiC(SO₂CF₃)₃, LiAsF₆ and
 LiSbF₆.

The US'846 patent claims a secondary power according to the above-mentioned aspects.

However, the US'846 patent does not expressly claim the specific negative electrode density.

Honbo et al disclose a lithium secondary battery wherein the negative electrode active material is characterized in containing carbon, and its negative electrode density is in the range larger than 0.95 g/cm³, and smaller than 1.5 g/cm³ (COL 3, lines 57-61).

In view of these disclosures, it would have been obvious to one skilled in the art at the time the invention was made to make the negative electrode of the US'846 patent by having the specific negative electrode density of Honbo et al as Honbo et al teach that if the negative electrode density is smaller than 0.95 g/cm³, vacancies in the negative electrode are numerous

Art Unit: 1745

and the specific surface area as the electrode is large. Accordingly, a large amount of positive electrode material is precipitated on the surface and inside of the negative electrode. The precipitated positive electrode material decreases the capacity of the negative electrode significantly, and makes the cycle life short. If the negative electrode density is larger than 1.5 g/cm³, the vacancy in the negative electrode is too small to make the electrolyte penetrate into the inside of the electrode. Therefore, the capacity of the negative electrode is decreased significantly, and the objective lithium secondary battery for mounting on power sources can not be obtained. Hence, those of ordinary skill in the art would obviously envision that the claimed negative electrode density is within the disclosed range, and therefore, an electrode having the claimed negative electrode density would exhibit the same desirable characteristics.

It is also noted that the combination of claims 7-8 of the US'846 patent as a single claim (as recited in claim 8 of the instant application 10/091502) represents an obvious variation resulting by combining single claims of the issued US'846 patent.

(11) *Response to Argument*

Applicant's arguments have been fully considered but they are not persuasive in overcoming the rejection.

In response to applicant's argument that "Honbo teaches that specific density range of negative electrode material prevents the precipitation of Mn" or "Honbo teaches that the specific density range of negative electrode material is specific to the Li/Mn oxide composition of the positive electrode", the fact that applicant has recognized another advantage which would flow naturally from following the suggestion of the prior art cannot be the basis for patentability when the differences would otherwise be obvious. See *Ex parte Obiaya*, 227 USPQ 58, 60 (Bd. Pat.

Art Unit: 1745

App. & Inter. 1985). In this regard, it is noted that Honbo et al teach a negative electrode active material characterized in containing carbon, and having a density in the range larger than 0.95 g/cc, and smaller than 1.5 g/cc. Thus, Honbo et al's teaching does clearly encompass the use of the negative electrode materials made of carbon and having the claimed density range regardless of the battery chemistry per se. Hence, Honbo et al directly teaches the use of carbon negative active material within the specified density magnitude.

With respect to applicant's argument that the density of the negative electrode is a result-effective variable, the examiner likes to contend that as set forth in MPEP 2144.05 Obviousness of Ranges, II. Optimization of Ranges, B. Only Result-Effective Variables Can Be Optimized: a particular parameter must first be recognized as a result-effective variable in the prior art, i.e. a variable which achieves a recognized result, before the determination of the optimum or workable ranges of said variable might be characterized as routine experimentation. In this case, applicant's argument basically agrees with the fact the negative electrode density should not be considered a result-effective variable at all. For example, applicants argued that: a) "in effect, applicants discovered that the density of the negative electrode is a result-effective variable that affects both the initial capacity and the change in capacity" (see page 3, lines 5-7 of the Request for Reconsideration After Final); b) "as described above, none of the other applied references describe the density of the negative electrode material, and therefore fail to recognize that the negative electrode density is result-effective in a secondary power source" (see page 5, lines 13-18 of the Request for Reconsideration After Final). Thus, since applicants share the same opinion that the prior art failed to recognize the negative electrode density is a result-effective variable, it

Art Unit: 1745

is therefore noted that the negative electrode density does not impart criticality in the secondary power source and, hence it is not supportive of patentable subject matter.

Regarding applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, the disclosures of both references are found to be within the same field of endeavor and, thus, relevant to each other because the battery environment disclosed in both references is fairly comparable, namely, both reference are directed to batteries or electrochemical cells having organic electrolyte systems. Furthermore, the examiner wishes to point out that the electrode of the prior art performs exactly the identical function specified in the instant claim in substantially the same way, and produces the substantially the same results as the claimed electrode of the present invention. Consequently, a person of ordinary skill in the art would have recognized the interchangeability of the element (i.e. the negative electrode) shown in the prior art for the corresponding element claimed in the instant invention. Since there are insubstantial differences between the negative electrode of the prior art and the claimed negative electrode, the burden is shifted to the applicant to provide objective evidence demonstrating that Honbo's negative electrode when used as applied in the battery of Kuruma et al will indeed cause detrimental effects thereto.

As far as the superior performance characteristics of the secondary power sources presented in Table 1 (Examples 1-7), the examiner likes to contend that such results and, thus, the specific power sources as prepared in EXAMPLES 1-7 are not commensurate to the specific secondary power source as claimed in claims 1-16. In this respect, it is emphasized that the instant (claimed) secondary power source lacks significant, essential, vital and/or crucial features, for instance, the specific binder material, the specific conducting agent material, the specific current collector and its material, the specific electrolyte comprising both the salt and the solvent and the specific mass ratio of every single power source component as presented in EXAMPLES 1-7. Thus, the foregoing performance characteristics of the exemplified secondary power sources does not reflect or correspond to the performance characteristic of the claimed power source. In this regard, it is further contended that the submission of objective evidence of patentability does not automatically mandate a conclusion of patentability in and of itself. Although the record may establish evidence of secondary considerations which might be indicia of nonobviousness, the actual record establishes such a strong case of obviousness that the objective evidence of nonobviousness is not sufficient to outweigh the evidence of obviousness. Accordingly, a prima facie case of obviousness cannot be simply rebutted by merely recognizing additional advantages or latent properties present in the prior art. Moreover, applicants must further show that the results were greater than those which would have been expected from the prior art to an unobvious extent, and that the results are of a significant and practical advantage. For example, it is noted that applicants have fairly argued that the specific negative electrode density somehow affects the capacity (its initial capacity and cycle capacity) of the power source (see page 5, last full paragraph and page 6, bridging paragraph and Figure 1 of the Request for

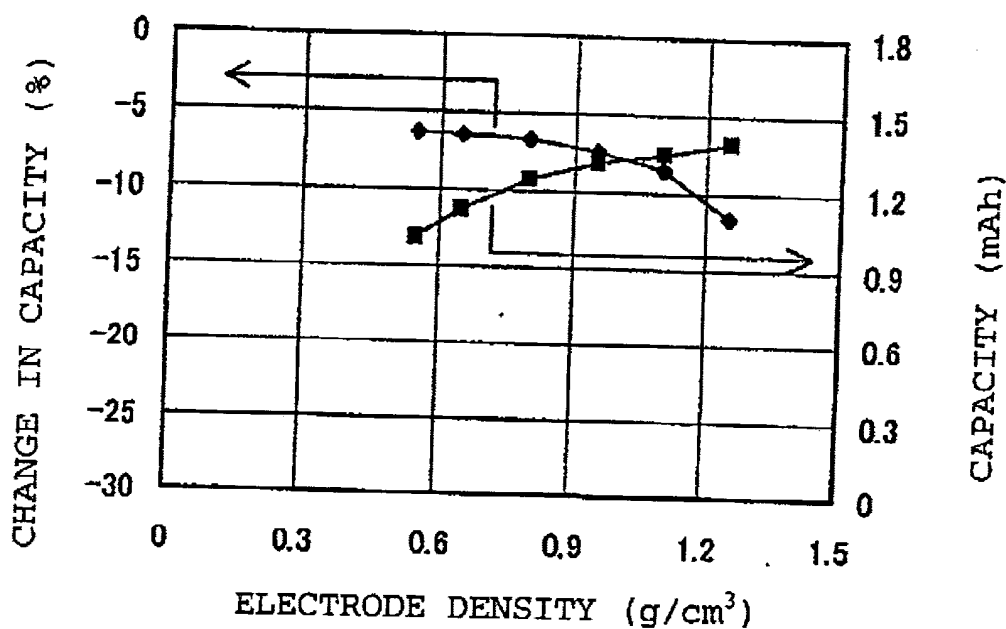
Art Unit: 1745

Reconsideration After Final). However, it is further noted that Honbo et al clearly teach that if the negative electrode density is smaller than 0.95 g/cc, vacancies in the negative electrode are numerous and the specific surface area of the electrode is large, accordingly, a large amount of positive active material is precipitated on and inside the negative electrode and thus, the precipitated material decreases the capacity of the negative electrode significantly, and makes the cycle life short. On the other hand, if the negative electrode density is larger than 1.5 g/cc, the vacancies is too small to make electrolyte penetrate into the inside of the electrode, and therefore, the capacity of the negative electrode is decreased significantly, and the objective secondary lithium battery can not be obtained (Honbo et al US 6399251, col 4, lines 1-15). Hence, since Honbo et al also teaches the criticality of the negative electrode density to the capacity of the power source, the unexpected properties of the claimed invention are not shown to have a significance equal to or greater than expected properties, and therefore, the evidence of unexpected properties is not sufficient to rebut the evidence of obviousness. Accordingly, although evidence has been presented in applicants' specification showing that particular negative electrode densities are effective, it has been concluded that these beneficial results would have been expected because one of the references (Honbo et al'251) is teaching that the specific negative electrode density is very efficient and provides better capacity results compared with other negative electrode densities.

Furthermore, the objective evidence of nonobviousness is not commensurate in scope with the instant claims which the evidence is offered to support. For instance, it is noted that data of Figure 1 showing improved capacity and cycle reduction characteristics does not evidence unexpected results for the entire claimed range of 0.6-1.2 g/cc or 0.7-1.0 g/cc because as

apparent from Figure 1 below, significant initial capacity of more than 1.2 mAh is reached at negative electrode densities greater than about 0.8-0.85 g/cc (not 0.6 g/cc or 0.7 g/cc as instantly claimed) and significant reduction in capacity of more than 7 % (assuming that 7 % is an acceptable reduction) are observed at negative electrode densities as low as about 0.9 – 0.95 g/cc or higher (not 1.0 g/cc or 1.2 g/cc as instantly claimed). For that reason, it is contended that the objective evidence of nonobviousness is not commensurate in scope with the present claims.

FIG. 1



Likewise, it is also unclear whether or not the synergistic effect of having or not having combined (as instantly claimed) the specific binder materials, conducting agent materials, or current collectors materials, electrolytes and their specific molar amount and composition as exemplified in EXAMPLES 1-7 will definitely improve or deteriorate such capacity characteristics. However, even assuming that the synergistic effect of the foregoing specific

components and their molar amounts/compositions are neglectable (or constants as argued), it is constructively asserted that the expected results are not commensurate in scope with the claimed invention as it has not been possible to ascertain a trend in the exemplified data that would allow the skilled artisan to reasonably extend the probative value thereof.

In response to applicant's argument that "Honbo teaches that specific density range of negative electrode material prevents the precipitation of Mn" or "Honbo teaches that the specific density range of negative electrode material is specific to the Li/Mn oxide composition of the positive electrode", the fact that applicant has recognized another advantage which would flow naturally from following the suggestion of the prior art cannot be the basis for patentability when the differences would otherwise be obvious. See *Ex parte Obiaya*, 227 USPQ 58, 60 (Bd. Pat. App. & Inter. 1985). In this regard, it is noted that Honbo et al teach a negative electrode active material characterized in containing carbon, and having a density in the range larger than 0.95 g/cc, and smaller than 1.5 g/cc. Thus, Honbo et al's teaching does clearly encompass the use of the negative electrode materials made of carbon and having the claimed density range regardless of the chemical environment of the battery. Hence, Honbo et al directly teaches the use of carbon negative active material within the specified density magnitude. In this manner, the examiner impartially upholds and remarks that the cited reference is in the field of applicant's endeavor or, at least, it is reasonably pertinent to the particular problem with which the inventor is concerned.

Concerning the double patenting rejection for claims 11-12, it is contended that the instant claims were not amended to recite the specific constituents of the positive electrode and negative materials as well as the excluding legal language "consisting essentially of such

Art Unit: 1745

materials" (as argued by the applicants). Thus, in the examiner's opinion, the combined double patenting rejection still reads on the instant claims.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

Raymond Alejandro
Examiner
Art Unit 1745

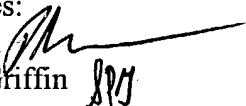
A handwritten signature in black ink, appearing to read 'RAM' with a stylized flourish underneath.

RAM
March 17, 2004

Conferees:

Pat Ryan

Steven Griffin

Two handwritten signatures in black ink. The first signature is for Pat Ryan and the second is for Steven Griffin.

OBLON, SPIVAK, MCCLELLAND, MAIER & NEUSTADT, P.C.
1940 DUKE STREET
ALEXANDRIA, VA 22314